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(71) Applicant *(for all designated States except US)*: OUMATIC OY [FI/FI]; Kenttäpostintie 10, SF-90160 Oulu (FI).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)* : JÄÄSKELÄINEN, Martti [FI/FI]; Kenttäpostintie 10, SF-90160 Oulu (FI). KANGAS, Matti [FI/FI]; Kuusikkotie 10, SF-90460 Oulunsalo (FI). KOSUNEN, Markku [FI/FI]; SF-91910 Tupos (FI).

(74) Agent: OY KOLSTER AB; Stora Robertsgatan 23, P.O. Box 148, SF-00121 Helsinki (FI).

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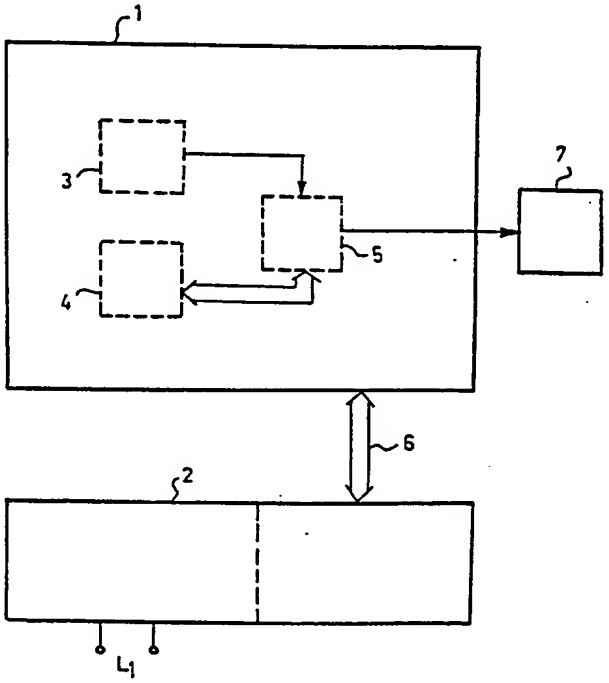
(54) Title: A REMOTE SUPERVISION SYSTEM

(57) Abstract

The invention relates to a remote supervision system for automatic supervision of tasks to be performed within a wide area at several working sites. The remote supervision system according to the invention comprises an interface unit (2) connected to a telephone line (L_1) and comprising means for activating the telephone line in response to a line signal from the telephone line, and means for converting tone pair signals received from the telephone line into digital codes, and a control unit (1) comprising a real time clock (3), a memory (4) including an expected report time set for the report of each task to be supervised, and means (5) for comparing the time generated by the real time clock (3) with the report times stored in the memory (4) and for giving an alarm if the time generated by the real time clock (3) is substantially the same as or deviates by a predetermined period of time from the report time stored for each particular task and if the control unit (1) has not received report of each particular task from the interface unit (2) in the form of a predetermined digital code.



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A remote supervision system

The invention relates to a remote supervision system for automatic supervision of tasks to be performed at several different working sites within a wide area.

Cleaning firms, for instance, have several working sites where their employees should go to perform their task at predetermined times on predetermined days. Since the number of the working sites as well as that of the employees is great and the working sites and times vary greatly from day to day, it is extremely difficult to supervise the performance of the tasks at each particular site at the right time. However, it would be necessary to know immediately if the employee has not arrived at the working site due to a mistake or illness or for some other reason, so that another employee could be contacted and ordered to perform the task. Such a supervision, however, would require a full-time supervisor, in big firms several supervisors, and the supervision would nevertheless be unreliable and incomplete.

Similar supervision is used and needed in industrial security services, too.

The object of the invention is to provide a remote supervision system which carries out the supervision automatically and reliably so that the supervision staff can attend to other duties.

This is achieved by means of a remote supervision system according to the invention, which is characterized in that an interface unit connected to a telephone line and comprising means for activating the telephone line in response to a line signal from the telephone line, and means for converting DTMF (dual-tone multifrequency) tone pair signals received from

the telephone line into digital codes, and a control unit comprising a real time clock, a memory including an expected report time set for the report of each task to be supervised, and means for comparing the time generated by the real time clock with the report times stored in the memory and for giving an alarm if the time generated by the real time clock is substantially the same as or deviates by a predetermined period of time from the report time stored for each particular task and if the control unit has not received report of each particular task from the interface unit in the form of a predetermined digital report code.

The basic idea of the invention is that the tasks and the predetermined report times thereof are stored in the memory of the supervision system. The supervision system compares the stored report times to the real time continually and automatically. If the employee at the working site contacts the supervision system through the public telephone network and sends it a report code corresponding to a certain task, the supervision system acknowledges receipt of the report and does not give an alarm at the stored report time. On the other hand, if no report code has been received by the stored report time, the supervision system automatically gives an alarm which may be an output transmitted to a display unit or a printer, a sound signal, a combination thereof, or some other suitable alarm. Thereby the supervision staff attending to other duties can take the required measures for checking and adjusting the situation.

The system is fully automatic and eliminates mistakes caused by human errors and omissions of tasks. The supervision data can be stored for long times ahead, and the supervision is not affected by

daily variation in working sites, supervision times, employees, and the like.

The supervision system according to the invention can be connected to the book-keeping and invoicing systems of the firm, utilizing the customer data stored therein and correspondingly supplying these systems with information about the performance of the tasks.

The invention will now be described in more detail by means of an embodiment with reference to the attached drawing, wherein one supervision system according to the invention will be illustrated in a block diagram form.

In this particular example, the supervision system comprises an interface unit 2 for connection to a telephone line L_1 of the public telephone network. The interface unit 2 comprises means for automatically activating the telephone line (forming a path for the loop current of the telephone line) and means for receiving the DTMF (dual-tone multifrequency) tone pair signals from the telephone line and for converting it into a digital code. The last-mentioned is usually a dual-tone multifrequency (DTMF) receiver known in the art, which converts the received voice-frequency pair into a BCD number. Suitable receivers include model MT8870 of Mitel Inc. The digital code formed from the received tone pair signals is transmitted through a signal bus 6 to a control unit 1. The interface unit 2 may further comprise an impulse-type dialer or a dual-tone multifrequency (DTMF) transmitter for transmitting the dialled number to the public telephone network. Suitable dual-tone multifrequency transmitters include MK5089 supplied by Mitel Inc. The transmitter is thereby controlled by the control unit 1 through the bus 6. The bus 6 represents generally

all control and data transmission buses and lines between the control unit 1 and the interface unit 2. The interface unit 2 may also include a voice synthesizer for communication with the employee via the public telephone network.

The control unit 1 controls the operation of the supervision system in all respects. It contains a memory 4 in which all necessary data concerning the tasks to be supervised are stored, preferably at least task codes and report times. The control unit 1 further comprises a real time clock which generates an output indicating the real time. The time generated by the real time clock comprises at least the clock time, preferably also the date, and possibly the weekday. The control unit 1 further comprises means 5 for comparing the output of the real time clock with the report times stored in the memory and gives an alarm if the predetermined report code has not been received through the interface unit 2 and the output of the real time clock 3 substantially corresponds to the report time stored for each particular task. The alarm can be given e.g. by outputting suitable data to a display unit or a printer, the display unit and the printer being represented generally by the block 7. The output may include, e.g., the working site, the name of the worker, and the stored report time. The alarm may also comprise a sound signal or an alarm formed by means of a speech synthesizer, which informs about the output to the display unit or printer.

The control unit 1 may process the report code supplied by the interface unit 6 in various ways. For instance, the file stored in the memory 4 may not only include the working site and the report time but also a special data field called a flag which provides information about whether the report has been received

or not. The flag may possess two states one of which indicates that the report is missing and the other that the report has been received. When the control unit 1 receives a report code from the interface unit 2, it changes the state of the flag stored in the memory 4. The comparing means 5, in turn, also check the state of the report flag when comparing the real time with the report time stored in the memory. If the report flag is set and the report code is received, the comparing means 5 do not give an alarm under any conditions.

In practice, the control unit 1 can be effected by means of a microcomputer, whereby the output unit 7 may be a display unit or printer connected to the microcomputer. The interface unit 2, in turn, may be an interface card enclosed in the same casing as the microcomputer.

The comparing means 5, for instance, may be the processing unit of the microcomputer; the memory 4 may be the central memory or mass storage of the microcomputer; and the real time clock 3 may be a counter in a timer attached to the microcomputer, the real time and date being generated from the counting of the counter by a software.

It is also possible that the employee correspondingly sends a report to the control system on leaving the working site, whereby the working time spent can be determined, which can be utilized in fixing the wages of the employee, pricing the task, etc. The supervision system can also be connected to the book-keeping and invoicing systems of the firm, obtaining information about the customers and providing them with information about the working times and performed tasks. The book-keeping and invoicing system may be a book-keeping and invoicing program to

be run in the same computer.

The figures and the description related thereto are only intended to illustrate the present invention. In its details, the remote supervision system according to the invention may vary within the scope of the attached claims.

Claims:

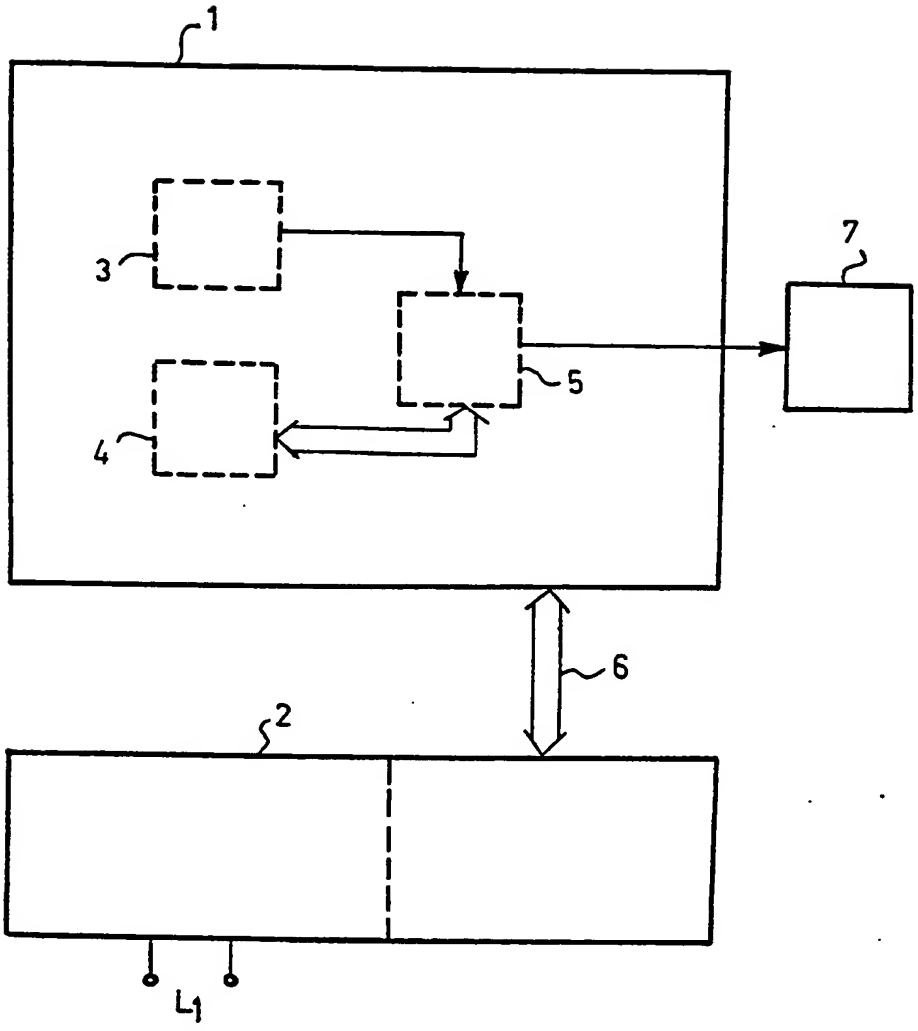
1. A remote supervision system for supervising tasks to be performed within a wide area at several sites, c h a r a c t e r i z e d in that the system comprises

an interface unit (2) connected to a telephone line (L_1) and comprising means for activating the telephone line in response to a line signal from the telephone line, and means for converting tone pair signals received from the telephone line into digital codes, and

a control unit (1) comprising a real time clock (3), a memory (4) including an expected report time set for the report of each task to be supervised, and means (5) for comparing the time generated by the real time clock (3) with the report times stored in the memory (4) and for giving an alarm if the time generated by the real time clock (3) is substantially the same as or deviates by a predetermined period of time from the report time stored for each particular task and if the control unit (1) has not received report of each particular task from the interface unit (2) in the form of a predetermined digital code.

2. A remote supervision system according to claim 1, c h a r a c t e r i z e d in that the memory (4) includes for each task not only a report time but also a report flag which is in the first state when the control unit (1) has not received a digital code of the task from the interface unit and in the second state when the digital code has been received.

3. A remote supervision system according to claim 1, c h a r a c t e r i z e d in that the control unit (1) outputs the alarm and the report to a printer and/or to a display unit (7).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INTERNATIONAL SEARCH REPORT

International Application No PCT/FI 89/00001

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [6]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC4: H 04 M 11/04

II. FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
IPC4	H 04 M 11/00, /04

Documentation Searched other than Minimum Documentation to the Extent that such Documents are included in the Fields Searched [8]

SE, NO, DK, FI classes as above.

III. DOCUMENTS CONSIDERED TO BE RELEVANT [9]

Category [10]	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
X	US, A, 4766548 (L A CEDRONE ET AL) 23 August 1988, see column 1, line 60 - column 3, line 44 --	1
X	US, A, 4747120 (S L FOLEY) 24 May 1988, see column 3, line 3 - line 54 --	1-3
A	US, A, 4748654 (W GRAY) 31 May 1988, see column 2, line 26 - line 61 --	1
A	US, A, 4743892 (F T ZAYLE) 10 May 1988, see column 2, line 5 - line 44 --	1
A	US, A, 4710616 (D L UTLEY) 1 December 1987, see column 2, line 13 - column 3, line 36 --	1

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IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
1989-05-24	1989-05-25
International Searching Authority	**Signature of Authorized Officer**
Swedish Patent Office	Stig Edhborg

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
A	US, A, 4524243 (L D SHAPIRO) 18 June 1985, see column 2, line 3 - column 3, line 9 --	1
A	US, A, 4024527 (F W HOUGHTON) 17 May 1977, see column 1, line 5 - column 2, line 60 --	1

ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO. PCT/FI 89/00001

SA 12345

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
The members are as contained in the European Patent Office EDP file on 03/03/89
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A- 4766548	23/08/88	WO-A- 88/05194	14/07/88
		AU-D- 78566/87	27/07/88
		EP-A- 0296179	28/12/88
US-A- 4747120	24/05/88	EP-A- 0212947	04/03/87
		AU-D- 61022/86	19/02/87
		JP-A- 62111392	22/05/87
US-A- 4748654	31/05/88	NONE	
US-A- 4743892	10/05/88	NONE	
US-A- 4710616	01/12/87	NONE	
US-A- 4524243	18/06/85	NONE	
US-A- 4024527	17/05/77	NONE	

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